ABSTRACT

An apparatus for producing the sequence of terahertz electromagnetic pulses by driven particle beam is disclosed. Initial electromagnetic beam (em-beam) is being sent to metal-dielectric structure the way that the field of said em-beam partially transforms into delayed electromagnetic wave, in preferred embodiment into the surface evanescent mode, and the beam of charged particles (cp-beam), in preferred embodiment electrons, is also being sent to said structure the way that the particles' kinetic energy partially transforms into energy of the delayed electromagnetic wave having the same phase-frequency's characteristics as transformed field of em-beam; at that, transformation of em-beam and excitation of wave by particles' cp-beam commonly take place at the same small space region, which is localized by said metal-dielectric structure. Delayed electromagnetic wave, which is generated by particle beam, is summarized with the field of em-beam, which is transformed on said structure, so, the particle beam influents on intensity of em-beam has observed after passing the region of localized transformation. The controlled changing of parameters of particle beam in interaction region leads to adequate changing of intensity of the em-beam passed through said region and this way the predetermined forming of electromagnetic pulses is realized. Alternatively, sequence of electromagnetic pulses is produced without initial electromagnetic beam directed to metal-dielectric structure, but due to presence of driven particle beam only.